

CLAIMS 1. A method for decorating the cylindrical wall with containers characterized in this - that it comprises with, less your following steps: a) one uses movable mandrels (12,13) mounted on a circuit in loop, each mandrel having a slightly low diameter with the diameter of the cylindrical wall of the container and being mounted on a support capable to move so that the axis of the mandrel remains parallel with a given direction D, the mounting of the mandrel on his support being carried out so that it can turn around its axis all into resistant with an effort exerted perpendicularly to that the axis; b) each container is brought successively to straight of a mandrel then fixed on the aforementioned mandrel; c) one brings the mandrel thus covered of the aforesaid container in the vicinity of a cylinder of pressure (11) which can turn around an axis parallel to the aforementioned direction D; d) pendent its displacement in direction of the aforesaid cylinder of pressure, the aforementioned mandrel is put in rotation around its axis; e) one makes ravel a carrier strip (14) of film transfer in the air-gap ranging between the cylinder of pressure (11) and the mandrel (13) covered of the aforesaid container; f) the mandrel (13) and rolls it pressure (11) are brought to the contact one of other, the cylindrical wall of the container and the surface of the cylinder of pressure being animated a substantially equal tangential speed, the aforementioned contact resulting in an effort exerted by the cylinder of pressure on the mandrel through the transferable film carrier strip and the wall of the container; g) one moves away then the carrier strip from the surface of the container, so that the portion of the film remaining transfer stuck to the wall of the container is detached of the aforesaid the carrier strip, thus materializing the decoration; h) one moves away then the mandrel unit and container from the cylinder of pressure to leave the place to the following mandrel; the aforementioned process being characterized in that:

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A) the aforementioned cylinder of pressure is animated, for example using a motor, typically an electric motor, of a rotational movement continuous around the said axis, the aforementioned axis being fixed;  
 B) the mandrel is put in rotation at a speed correlated with that of the cylinder of pressure so that when the mandrel arrives at straight of the cylinder of pressure, the tangential speed of the cylindrical wall of the container in rotation is substantially equal at the tangential speed of the surface of the cylinder of pressure;  
 C) one makes ravel the film transfer carrier strip in the air-gap ranging between the cylinder of pressure and the mandrel covered of the aforesaid container so that it moves at a substantially equal linear speed at the tangential speeds of those.

2) Proceeded according to the claim 1 in which the aforementioned cylinder of pressure is a cylinder of marking (11) provided with an etched surface.

3) Proceeded according to claim 2 in which the applied effort by the portions in relief of the aforesaid etched surface involves the compression of a portion of the film transfer which is thinned and adheres on the wall of the cylindrical container and in which, when one moves away the carrier strip from the surface of the container, the marked portion of the film transfer which remains stuck to the wall of the container is detached of the aforesaid the carrier strip, thus materializing the decoration to be realized.

4) Proceeded according to claim 2 or 3 in which the aforementioned cylinder of marking is heating and the aforementioned film transfer is a thermal film transfer.

5) Proceeded according to the claim 4 in which, when the aforementioned carrier strip (12) left the zone of marking because of rotation of the mandrel (13), one maintains the carrier strip (12) on the cylindrical wall of the pendent container a sufficient time to allow the cooling of the carrier strip and film marked transfer until a temperature facilitating it

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detachment of film by cutting along the border enters the marked zone and the nonmarked zone.

6) Proceeded according to any of the claims 1 to 5 in which the aforementioned mandrels are mounted on a rotary plate whose axis of rotation is parallel with the axes of the mandrel.

7) Proceeded according to the claim 6 in which the aforementioned rotary plate functions with the step by step, the mandrel being with each stop with straight of a zone of handling or treatment of the container.

8) Proceeded according to any of the claims 1 to 7 in which the mandrel is put in rotation by making so that it can reach suitable speed front to await the zone of marking.

9) Proceeded according to the claim 8 in which the aforementioned cylinder of pressure (11) turns at number of constant revolutions.

10) Proceeded according to any of claims 2 to 9 in which the position of the cylinder axis of marking (11) is defined compared to the trajectory (20) of the mandrels so that when they arrive at the contact one of other, an effort is applied on the generator of contact, sufficiently low so that the mandrel can mechanically resist and sufficiently substantial so that the film transfer is marked by the reliefs of the etched surface of the cylinder.

11) Proceeded according to any of claims 4 to 10 in which the cylindrical body is a flexible tube, whose cylindrical skirt has one thickness ranging between 250 and 600 micra, the prescribed temperature of marking by the cylinder of heating marking lies between 80 and

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250 C and the effort of support of the cylinder on the mandrel are included/understood enters 2 N/mm and 40 N/mm.

12) Proceeded according to any of claims 4 to 11 in which one maintains, after marking, the tape-support on the cylindrical wall of the container on an angular aperture has upper with 20, preferably upper to 30.

13) Proceeded according to any of claims 4 to 12 in which one maintains, after marking, the tape-support on the

cylindrical wall of the container, until the surface of the container reaches a low average temperature at 80 C, preferably low at 60 C.

14) Proceeded according to any of the claims 4 to 13 in which a driving mechanism (31) of the carrier strip (14) is mounted downstream from the zone of marking so that the tension of the carrier strip is lowest possible with extended from the zone of marking.

15) Process according to any of claims 4 to 13 in which, pendent the marking, one makes move a driving mechanism of the carrier strip (14) so that it enters the trajectory (20) of the mandrels while making it possible to plate the carrier strip on the wall of the container, the contact being maintained on an upper angular aperture with 30.

16) Process according to any of the claims 4 to 15 in which one makes circulate a cold airflow on the carrier strip with extended from the zone of marking.

17) Process according to any of the claims 2 to 16 in which, after hafting of the container on the mandrel (12), one makes turn it

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mandrel, one carries out an optical determination (40) of an index prémarqué on the aforementioned container and one calculates the rotation of the mandrel so that the cylindrical wall of the container arrives in contact with the surface of the cylinder of marking while being presented according to a predefined angular position, with a substantially equal tangential speed at the tangential speed of etched surface of the aforesaid cylinder of marking.

18) Proceeded according to claim 17, in which the device (40) allowing the optical determination of a prémarqué index of the decoration is supplemented by a second optical device, typically a video camera, connected to a corrective computational system which, using a software of analysis of image, makes it possible to correct the angular and axial position mandrel.

19) Process allowing the formation of a decoration in relief on the cylindrical walls of containers characterized in that it comprises at least the following steps: a) one uses movable mandrels (12,13) mounted on a circuit in loop, each mandrel having a slightly low diameter with the diameter of the cylindrical wall of the container and being mounted on a support capable to move so that the axis of the mandrel remains parallel with a given direction, the mounting of the mandrel on his support being carried out so that it can turn around its axis all into resistant with an effort exerted perpendicularly to that the axis; b) each container is brought successively to straight of a mandrel then fixed on the aforementioned mandrel; c) one brings the mandrel thus covered of the aforesaid container in the vicinity of a cylinder of marking (11), the aforementioned cylinder of marking having an etched surface according to the wished decoration, the aforementioned etched surface being animated of a rotational movement continuous around the of the aforesaid fixed axis rolls marking;

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d) pendent its displacement in direction of the aforesaid cylinder of marking, the aforementioned mandrel is put in rotation at a speed correlated with that of the cylinder of marking so that when the mandrel arrives at straight of the cylinder of marking, the tangential speed of the cylindrical wall of the container in rotation is substantially equal at the tangential speed of the etched surface of the cylinder of marking; e) the mandrel (13) and rolls it marking (11) are brought to the contact one of other, the aforementioned contact resulting in an effort exerted by the cylinder of marking on the mandrel through the wall of the container, the aforementioned effort being applied by the portions in relief of etched surface, involving the marking of the wall of the cylindrical container; f) when the totality of the decoration is marked, one moves away the mandrel unit and container from the cylinder of marking to leave the place to the following mandrel (12).

20) Device allowing to implement the process according to any of claims 1 to 19 characterized in that it is about a machine including/understanding a fixed plate placed at the glance of a rotary plate functioning with the step by step, the aforementioned rotary plate being provided with mandrels (12,13) being able to turn around their axis, the aforementioned axis being parallel with the axis of rotation of the plate, the aforementioned mandrels being brought successively during the rotation of the plate in several working areas spared on the fixed plate, these working areas including/understanding at least: a) a zone of food where the cylindrical bodies are brought taking into consideration a mandrel then fixed around the said mandrel b) delivery or a marking point of a decoration on the cylindrical wall of the aforesaid containers including/understanding at least a cylinder of pressure (11) in continuous rotation around a parallel fixed axis with the axis of the plate, preferably with a number of constant revolutions, placed in a place such as when a mandrel (13) arrives at straight the of the aforesaid cylinder, this one comes into contact the aforementioned mandrel by exerting an effort of support distributed on one

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generator, mandrels being driven by means of carrying in rotation, typically of the servo-motors, allowing to pass from a null tangential speed at an equal tangential speed to that of the cylinder of pressure at the end of a low lapse of time to that which corresponds to the displacement of the container of a working area to the following one; c) a zone of evacuation of the containers.

21) Device according to the claim 20 in which the cylinder of pressure is a cylinder of marking provided with an etched surface.

22) Device according to claim 20 or 21, also including/understanding a device of run (30) of a tape-support (14) of film transfer, making ravel the tape in the zone of marking, the aforementioned device being provided with systems (31) allowing to control the tension of the tape, especially with extended from the zone of marking.

23) Device according to any of claims 20 to 22 applied with the decoration of cylindrical skirts of flexible tubes characterized in that it is about a machine including/understanding a fixed plate placed at the glance of a rotary plate functioning with the step by step, the aforementioned rotary plate being provided with mandrels (12, 13) having their axis parallel with the axis of rotation of the plate and being able to turn around their axis, said mandrels being brought successively during the rotation (R) of the plate in several working areas spared on the fixed plate: - the aforementioned

zone of power supply of the flexible tubes and hafting of the cylindrical skirts of the aforesaid flexible tubes around the mandrel; - an optional zone of décarottage of the head of tube; - an optional zone of installation of closure membrane on the dispensing port; - an optional zone of bouchonnage; - the aforementioned zone of marking; - an optional zone of control of the decorations obtained;

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- the aforementioned zone of evacuation of the flexible tubes.

24) Device according to the claim 23 in which, directly upstream of the zone of marking is spared a zone of indexing, where a device (40) of optical location makes it possible to detect the angular position of a spot materializing a known point particular of the decoration and in which the rotation of the mandrel (12) is actuated by a servo-motor controlled using an algorithm which makes it possible to calculate, from given supplied by the optical device of location (40), the correction required to bring the cylindrical body to the station of marking to the good position and the good number of revolutions.

25) Device according to the claim 24 in which the optical device of location (40) is supplemented by a second optical device, typically a video camera, connected to a corrective computational system which, using a software of analysis of image, makes it possible to correct the angular and axial position mandrel.

26) Proceeded to decorate the cylindrical walls with containers characterized in that it comprises at least the following steps: a) one uses movable mandrels (12,13) mounted on a circuit in loop, each mandrel having a slightly low diameter with the diameter of the cylindrical wall of the container and being mounted on a support capable to move so that the axis of the mandrel remains parallel with a direction

D, the mounting of the mandrel on its support being carried out manner so that it can turn around its axis all into resistant with an effort exerted perpendicularly to that the axis; b) each container is brought successively to straight of a mandrel then fixed on the aforementioned mandrel;

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c) the cylindrical wall of each container is printed according to the decoration desired with an ink or a varnish supporting the adhesion of a film transfer; - D) one brings the mandrel thus covered of the aforesaid container in the vicinity of a cylinder of pressure, the aforementioned cylinder being animated of a rotational movement continuous around a parallel fixed axis with the aforementioned direction D; e) pendant its displacement in direction of the aforesaid cylinder of pressure, the aforementioned mandrel is put in rotation at a speed correlated with çeiie. cylinder of pressure so that when the mandrel arrives at straight of the cylinder of pressure; the tangential speed of the wall of the container in rotation is. substantially equal at the tangential speed of the surface of the cylinder of: pressure; f) one makes ravel a carrier strip. of film transfer in the air-gap ranging between the cylinder of pressure and the mandrel, so that when it arrives in the aforementioned air-gap, it moves at a substantially equal linear speed at the circumferential speeds of those; g) . mandrel and the cylinder of pressure are brought to the contact i' one of other, the aforementioned contact resulting in an effort exerted by the cylinder of pressure on the mandrel. through the film transfer carrier strip and the cylindrical wall of the container, the aforementioned effort involving the compression of the film transfer, resulting in an adhesion of a portion of the aforesaid. film transfer on the printed portion of the wall of the cylindrical container; h) one moves away then the carrier strip from the surface of the container, so that the portion of the film remaining transfer stuck to the wall of the container is detached of the aforesaid the carrier strip, thus materializing the decoration; i) one moves away the mandrel unit and container from the cylinder to leave the place to the following mandrel (12).

27) Proceeded to decorate the cylindrical walls with containers according to claim 26 modified in what the cylindrical wall of each container is printed according to the decoration desired with an ink or a supporting varnish

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the repulsion of the aforesaid film transfer and in what the aforementioned mandrel and the aforementioned cylinder of pressure are brought to the contact l one of other, the aforementioned contact being translated by-a effort exerted by E rolls pressure on the mandrel through the film transfer carrier strip and the cylindrical wall of the container, the aforementioned effort involving the compression of the film transfer, resulting in an adhesion of a portion of the aforesaid film transfer on the nonprinted portion of the wall of the cylindrical container, 28) Procédé according to the claim 27 in which the aforementioned film transfer has adhesive properties.

29) Proceeded according to claim 28 in which the cylinder of pressure is heating so that at the time of the support of the cylinder of pressure on the sleeve through the film transfer, this last acquires the aforementioned adhesive properties.